CLEAN DEVELOPMENT MECHANISM
PROGRAM ACTIVITY DESIGN DOCUMENT FORM (CDM-CPA-DD)
Version 01

CONTENTS

NOTE:

(i) This form is for the submission of CPAs that apply a large scale methodology using provisions of the proposed PoA.

(ii) The coordinating/managing entity shall prepare a CDM Programme Activity Design Document (CDM-CPA-DD)[1,2] that is specified to the proposed PoA by using the provisions stated in the PoA DD. At the time of requesting registration the PoA DD must be accompanied by a CDM-CPA-DD form that has been specified for the proposed PoA, as well as by one completed CDM-CPA-DD (using a real case). After the first CPA, every CPA that is added over time to the PoA must submit a completed CDM-CPA-DD.

[1] The latest version of the template form CDM-CPA-DD is available on the UNFCCC CDM web site in the reference/document section.

[2] At the time of requesting validation/registration, the coordinating managing entity is required to submit a completed CDM-POA-DD, the PoA specific CDM-CPA-DD, as well as one of such CDM-CPA-DD completed (using a real case).

SECTION A. General description of CDM programme activity (CPA)

A.1. Title of the CPA:

[XXX] Biomass Power Plant [XXX] (CPA REFERNCE NUMBER)

Version: [XXX]
Date completed: [XXX]

A.2. Description of the CPA:

The [XXX] Biomass Power Plant (CPA REFERNCE NUMBER) CDM project activity (hereafter referred to as "CPA") is the establishment of [XXX]. The CPA will be developed by [XXX] (hereafter referred to as "project owner"), and is a biomass-residue-fuelled power-only plant located in [XXX]. The CPA is to be coordinated and managed under the Malaysia Biomass Power Plant Programme of Activities (hereafter referred to as "PoA") by the coordinating and managing entity (CME), Integra Carbon Sdn Bhd (Integra).

[BACKGROUND TO THE REQUIREMENT OF CPA]

The CPA contributes to sustainable development of [XXX].

1. Sustainable development
    - [XXX]
2. Environmental sustainability
    - [XXX]
3. Social sustainability
    - [XXX]
4. Economic sustainability
    - [XXX]

A.3. Entity/individual responsible for CPA:

Name of Party involved (*) ((host) indicates a host Party)	Private and/or public entity (ies) project participants (*) (as applicable)	Project Implementer (Yes/ No)	Kindly indicate if the Party involved wishes to be considered as project participant (Yes/ No)
Malaysia (host)	[XXX]	[XXX]	[XXX]
ANNEX I	[XXX]	[XXX]	[XXX]

Integra Carbon Sdn Bhd (Integra) will be the coordinating and managing entity (CME) for this CPA under the PoA.

A.4. Technical description of the CPA:

[DETAIL TECHNICAL DESCRIPTION OF THE CPA]

[DIAGRAME OF PROJECT BOUNDARY]

A.4.1. Identification of the CPA:

The CPA is provided with a unique identification linked to the GPS coordinates in a decimal degrees format – [XXX] (XXX)

A.4.1.1. Host Party:

Malaysia

A.4.1.2. Geographic reference of other means of identification allowing the unique identification of the CPA (maximum one page):

The CPA is a [STATIONARY/MOBILE] CPA, and the unique geographic identification of the CPA is [XXX]. [DESCRITPION OF PROEJCT SITE]

[MAP SHOWING LOCATION OF PROJECT ACTIVITY]

A.4.2. Duration of the CPA:

A.4.2.1. Starting date of the CPA:

[XXX]

[THE EARLIEST DATE AT WHICH THE IMPLEMENTATION OR CONSTRUCTION OR REAL ACTION BEGINS, AND CANNOT BE PRIOR TO THE COMMENCEMENT OF VALIDATION OF THE POA, I.E. THE DATE WHICH THE CDM-POA-DD IS FIRST PUBLISHED FOR GLOBAL STAKEHOLDER CONSULTATION]

A.4.2.2. Expected operational lifetime of the CPA:

[XXX]

A.4.3. Choice of the crediting period and related information:

Renewable crediting period; or

Fixed Crediting period

[Delete the one that is not applicable]

[PROJECT PARTICIPANT HAS TO CHOOSE AND STATE EITHER ONE OF THE OPTIONS ABOVE]

A.4.3.1. Starting date of the crediting period:

[XXX]

A.4.3.2. Length of the crediting period, first crediting period if the choice is renewable CP:

The length of the crediting period is [10/7] years, [fixed/renewable]

A.4.4. Estimated amount of emission reductions over the chosen crediting period:

Years	**Annual estimation of emission reductions in tonnes of CO_2e**
Year 1	XXX
Year 2	XXX
Year 3	XXX
Year …	XXX
Total estimated reductions (tonnes of CO_2e)	XXX
Total number of crediting years	[10/7] years
Annual average over the crediting period of estimated reductions (tonnes of CO_2e)	XXX

A.4.5. Public funding of the CPA:

The CPA [HAS/HAS NOT] obtained and [IS/ IS NOT] seeking any public funding

[IN CASES WHERE THE CPA USES ANY PUBLIC FUNDING, THE INFORMATION REGARDING THE PUBLIC FUNDING WILL BE PROVIDED; TO BE INCLUDED INTO ANNEX 2]

A.4.6. Confirmation that CPA is neither registered as an individual CDM project activity nor is part of another Registered PoA:

The CME has checked and confirmed that the project has not been registered as an individual CDM project activity, nor is part of another Registered PoA, by consulting the CPA and PoA database in the UNFCCC website and the host country's Designated National Authority.

The project owner, [XXX], has issued an authorization letter to the CME informing that they are aware of and have agreed that the project activity will be subscribed to the PoA; and that the project is not registered as a CDM project activity or as a CPA of another PoA.

SECTION B. Eligibility of CPA and Estimation of emissions reductions

B.1. Title and reference of the Registered PoA to which CPA is added:

The tile of the PoA to which this CPA is added to is "Malaysia Biomass Power Plant Project"

Version: [XXX]
Date: [XXX]

B.2. Justification of the why the CPA is eligible to be included in the Registered PoA :

The CPA is eligible to be included into the PoA as it complies with all the eligibility criteria required under section A.4.2.2 of the PoA

No.	PoA eligibility criteria for CPA inclusion	Justification of CPA inclusion
a)	All CPA are within the geographical boundary including any time-induced boundary set in the PoA, per section A.4.1.2 of this PoA	[XXX]
b)	Each CPA included in this PoA will have a unique identification number as a reference. To avoid double counting, each included CPA with its reference number will be linked with the geographic coordinates of the power plant marked by GPS	[XXX]
c)	The applicable projects activities are those that generate electricity in biomass residue (co-)fired power-only plants. The project activity may include the following activities, or where applicable, combinations of these activities: (i) The installation of new biomass residues (co-)fired power-only plants at a site where currently no power generation occurs (Greenfield power projects); (ii) The installation of new biomass residues (co-)fired power-only plants, which replace or are operated next to existing power-only plants fired with fossil fuels and/or biomass residues (power capacity expansion projects); (iii) The improvement of energy efficiency of exiting biomass residues (co-)fired power-only plants (energy efficiency improvement projects), which can also lead to a capacity expansion, e.g. by retrofitting the existing plant; (iv) The total or partial replacement of fossil fuels by biomass residues	[XXX]

d)	The start date of each CPA will be based on documentary evidence on implementation or construction or real action of the CPA	[XXX]
e)	Each CPA must adhere to the applicability, baseline and monitoring methodology of ACM 0018 "Consolidated methodology for electricity generation from biomass residues in power-only plants" version 02.0.0 methodology or future update	[XXX]
f)	Each CPA to demonstrate the project additionality by applying procedures provided in the procedure for the selection of baseline scenario and demonstration of additionality as stated in the latest version of ACM0018	[XXX]
g)	The PoA-specific requirements stipulated by the CME: (i) The CME has approved the participation of the CPA into the PoA; (ii) Local stakeholder meeting shall be conducted at the CPA level; (iii) Environmental impact assessment is not required for the implementation of project activity generating power from utilization of biomass residues per the Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) Order 1987; (iv) An electricity purchase agreement (example: REPPA for grid connected power agreement) to be signed between project owner and relevant third party (example: Tenaga Nasional Berhad).	[XXX]
h)	Each CPA shall provide written affirmation that if there is funding from Annex 1 parties, and that said funding does not result in a diversion of official development assistance	[XXX]
i)	The target group is grid connected entities. The distribution mechanism is either by direct installation or contractual installation	[XXX]
j)	Each CPA will be verified individually	[XXX]

For compliance to item e) of PoA eligibility criteria for CPA inclusion; the methodological applicability is listed as per below:

Requirement for applicability of methodology	**Compliance of CPA with the given requirement**
1) No other biomass types than biomass residues, as defined in the methodology are used in the project plant	[XXX]

2) Fossil fuels may be co-fired in the project plant. However, the amount of fossil fuels co-fired shall not exceed 80% of the total fuel fired on an energy basis	[XXX]
3) For projects that use biomass residues from a production process (e.g. production of sugar or wood panel boards), the implementation of the project shall not result in an increase of the processing capacity of raw input (e.g. sugar, rice, logs etc) or in other substantial changes (e.g. product change) in this process	[XXX]
4) The biomass residues used by the project facility should not be stored for more than one year	[XXX]
5) Projects that chemically process the biomass residues prior to combustion (e.g. by means of esterification, fermentation and gasification) are not eligible under this methodology. The biomass residues can however be processed physically such as by means of drying, pelletization, shredding and briquetting.	[XXX]
6) No power and heat plant operates at the project site during the crediting period	[XXX]
7) If any heat is generated for purposes other than power generation (e.g. heat which is produced in boilers or extracted from the heater to feed thermal loads in the process) during the crediting period or was generated prior to the implementation of the project activity, by any on-site or off-site heat generation equipment connected to the project site, the following conditions should apply: a) The implementation of the project activity does not influence directly or indirectly the operation of the heat generation equipment, i.e. the heat generation equipment would operate in the same manner in the absence of the project activity; b) The heat generation equipment does not influence directly or indirectly the operation of the project plant (e.g. no fuels are diverted from the heat generation equipment to the project plant); and c) The amount of fuel used in the heat generation equipment can be monitored and clearly differentiated from any fuel used in the project activity	[XXX]
8) In the case of fuel switch project activities, the	[XXX]

use of biomass residues or the increase in the use of biomass residues as compared to the baseline scenario is technically not possible at the project site without a capital investment in: • The retrofit or replacement of existing heat generators/boilers; or • The installation of new heat generators/boilers; or • A new dedicated biomass residues supply chain established for the purpose of the project (e.g. collecting and cleaning contaminated new sources of biomass residues that could otherwise not be used for energy purposes); • Equipment for preparation and feeding of biomass residues	

Early consideration of CDM
[XXX]

[TABLE ON CHRONOLOGY OF EVENTS; IF APPLICABLE]

B.3. Assessment and demonstration of additionality of the CPA, as per eligibility criteria listed in the Registered PoA:

The selection of baseline scenario and demonstration of additionality is conducted by applying the following steps:

Step 1 – Alternative scenarios for power generation:

Alternative P1: The proposed activity not undertaken as a CDM project activity
[XXX]

Alternative P2: If applicable, the continuation of power generation in existing power-only plants fired with biomass residues, or fossil fuels, or a combination of both, at the project site. The existing power-only plants would operate at the same conditions (e.g. installed capacities, average load factors, or average energy efficiencies, fuel mixes, and equipment configuration) as those observed in the most recent three years prior to the project activity
[XXX]

Alternative P3: If applicable, the continuation of power generation in existing power-only plants fired with biomass residues, of fossil fuels, or a combination of both, at the project site. The existing power-only plants would operate with different conditions from those observed in the most recent three years prior to the project activity
[XXX]

Alternative P4: If applicable, the retrofitting of existing power-only plant fired with biomass residues, or fossil fuels, or a combination of both, at the project site. The retrofitting may or may not include a change in fuel mix
[XXX]

Alternative P5: The generation of power in the grid
[XXX]

Alternative P6: The installation of new power-only plants fired with biomass residues, or fossil fuels, or a combination of both, at the project site, using the same amount or less biomass residues than under scenario P1
[XXX]

Alternative P7: The installation of a new power-only plants fired with biomass residues, or fossil fuels, or a continuation of both, at the project site, using more biomass residue than under scenario P1
[XXX]

Alternative scenarios for biomass residue utilization
Alternative B1: The biomass residues are dumped or left to decay mainly under aerobic conditions. This applies, for example, to dumping and decay of biomass residues in fields.

Alternative B2: The biomass residues are dumped or left to decay under clearly anaerobic conditions, in landfills which are deeper than 5 meters. This does not apply to biomass residues that are stock piled or left to decay on fields

Alternative B3: The biomass residues are burned in an uncontrolled manner without utilizing it for energy purposes

Alternative B4: The biomass residues are used for electricity generation in power-only plant configuration at the project site in new and/or existing power plants

Alternative B5: The biomass residues are used for power and/or heat generation in other existing or new power plants at other sites

Alternative B6: The biomass residues are used for other energy purposes, such as the generation of bio-fuel

Alternative B7: The biomass residues are used for non-energy purposes, e.g. as fertilizer or as feedstock in processes (e.g. in the pulp and paper industry)

Alternative B8: The primary source of biomass residues and/or their fate in the absence of the project activity cannot be clearly defined

For the selection of the baseline scenario for the use of biomass residues, the table below gives the biomass type envisages for use in the project activity along the crediting period, and its fate in the absence of the project activity.

[TABLE FOR BIOMASS RESIDUES CATEGORIES]

As provided in the methodology, an *ex ante* estimation of the biomass is provided and the quantities will be updated every year of the crediting period as part of the monitoring plan, so as to reflect the actual use of biomass residues in the project scenario. Along the crediting period, new categories of biomass residues (i.e. new types, new sources with different fate) can be used in the project activity; and in such cases, a new line will be added into the table.

[TABLE FOR AVAILABILITY OF BIOMASS RESIDUE]

After the analysis, the remaining baseline alternative scenarios are below:
Power generation:

1) [OPTIONS]
2) [OPTIONS]
3) …

Use of biomass residues:

1) [OPTIONS]
2) [OPTIONS]
3) …

Step 2: Barrier Analysis

Power Generation Component:

[OPTIONS]	XXX
Investment	XXX
Technological	XXX
Lack of prevailing practice	XXX

Biomass Residue Component:

[OPTIONS]	XXX
Investment	XXX
Technological	XXX
Lack of prevailing practice	XXX

[DISCUSSION ON ALTERNATIVE SCENARIOS]

Step 3: Investment Analysis

[DISUCSSION ON FINANCIAL FEASIBILITY]

Step 4: Common Practice Analysis

[DISCUSSION ON COMMON PRACTICE ANALYSIS]

B.4. Description of the sources and gases included in the project boundary and proof that the CPA is located within the geographical boundary of the registered PoA.

Table 12: Overview on emission sources included in or excluded from the project boundary

	Source	Gas		Justification/ Explanation
Baseline	Electricity generation	CO_2	Included	Main emission source
		CH_4	Excluded	Excluded for simplification. This is conservative
		N_2O	Excluded	Excluded for simplification. This is conservative

	Uncontrolled burning or decay of surplus biomass residues	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF[3] sector
		CH_4	To be decided by CPA	CPA may decide to include this emission source, where case B1, B2 or B3 has been identified as the most likely baseline scenario
		N_2O	Excluded	Excluded for simplification. This is conservative
	Source	**Gas**		**Justification/ Explanation**
Project Activity	On-site fossil fuel consumption	CO_2	Included	May be an important emission source
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small
	On-site and off-site transportation and processing of biomass residues	CO_2	Included	May be an important emission source
		CH_4	Excluded	Excluded for simplification. This emission source is assumed to be very small
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small
	Combustion of biomass residues for electricity	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector
		CH_4	Included or excluded	This emission source must be included if CH_4 emissions from uncontrolled burning or decay of biomass residues in the baseline scenario are included
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small
	Storage of biomass residues	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector
		CH_4	Excluded	Excluded for simplification. Since biomass residues are stored for not longer than one year, this emission source is assumed to be small
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be very small
	Wastewater from the treatment of biomass residues	CO_2	Excluded	It is assumed that CO_2 emissions from surplus biomass residues do not lead to changes of carbon pools in the LULUCF sector
		CH_4	Included	This emission source shall be included in cases where the waste water is treated (partly) under anaerobic conditions
		N_2O	Excluded	Excluded for simplification. This emission source is assumed to be small

[TABLE ON THE EXTENT OF CPA BOUNDARY IS AS FOLLOWS]:

No.	Spatial extent of project boundary as per ACM0018 methodology	CPA project

[3]LULUCF – Land Use, Land-Use Change and Forestry

		boundary
1.	The project activity power-only plant(s);	[XXX]
2.	All other on-site power-only plants, whether fired with biomass residues, fossil fuels or a combination of both;	[XXX]
3.	All power plants connected physically to the electrical system (grid) that the project plant is connected to;	[XXX]
4.	If applicable, the means of transportation of biomass residue to the project site;	[XXX]
5.	If applicable, the site where the biomass residues would have been left for decay or dumped;	[XXX]
6.	If the biomass residues involve any type of processing prior to combustion such as drying, pelletization, shredding, briquetting, etc., two options can be considered. The biomass residues processing plant can be included in the project boundary and the primary source of the biomass residues is assessed according to the procedures described in the following section. Or else, the biomass residues processing plant is not included in the project boundary and then the processed biomass obtained from that plant should be considered as alternative B8 in the following section;	[XXX]
7.	If applicable, the wastewater treatment facilities used to treat the wastewater produced from the treatment of biomass residues.	[XXX]

[THE PROJECT BOUNDARY DIAGRAM]:

B.5. Emission reductions:

B.5.1. Data and parameters that are available at validation:

Data / Parameter:	**[XXX]**
Data unit:	[XXX]
Description:	[XXX]
Source of data used:	[XXX]
Value applied:	[XXX]
Justification of the choice of data or description of measurement methods and procedures actually applied :	[XXX]
Any comment:	[XXX]

B.5.2. Ex-ante calculation of emission reductions:

Emission Reductions:

Emission reductions are calculated as follows:

$$ER_y = BE_y - PE_y - LE_y \quad \textbf{(1)}$$

Where:
ER_y emissions reductions during year *y* (tCO_2e)
$BE_{,y}$ baseline emissions during year *y* (tCO_2e)
PE_y project emissions during year *y* (tCO_2e)
LE_y leakage emissions during year *y* (tCO_2e)

Baseline Emissions:
Baseline emissions are calculated as follows:

$$BE_y = BE_{EL,y} + BE_{BR,y} \quad \textbf{(2)}$$

Where:
BE_y baseline emissions in year *y* (tCO_2e)
$BE_{EL,y}$ baseline emissions due to generation of electricity in year *y* (tCO_2e)
$BE_{BR,y}$ baseline emissions due to uncontrolled burning or decay or biomass residues in year *y* (tCO_2e)

Baseline emissions are determined through the following steps:

Step 1: Determination of $BE_{EL,y}$
Baseline emission from electricity generation are calculated based on the net quantity of electricity generated at the project site under the project scenario ($EF_{PJ,y}$) and a baseline emission factor ($EF_{BL,EL,y}$) which expresses the weighted average CO_2 intensity of electricity generation in the baseline, as follows:

$$BE_{EL,y} = EG_{PJ,y} \cdot EF_{BL,EL,y} \quad \textbf{(3)}$$

Where:
$BE_{EL,y}$ baseline emissions due to generation of electricity in year *y* (tCO_2)
$EG_{PJ,y}$ net quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year *y* (MWh)
$EF_{BL,EL,y}$ emission factor for electricity generation in the baseline in year *y* (tCO_2/ MWh)

For this methodology, it is assumed that transmission and distribution loses in the electricity grid are not influenced significantly by the project activity and are therefore not accounted for.

Step 1.1: Determination of $EG_{PJ,y}$
The net quantity of electricity generated in all power plants which are located at the project site and included in the project boundary ($EF_{PJ,y}$) is determined as the difference between the gross electricity generation at the project site ($EF_{PJ,gross,y}$) and the auxiliary electricity consumption required for the operation of the power plants at the project site ($EF_{PJ,aux,y}$), as follows:

$EG_{PJ,y}$ is determined as follows:

$$EG_{PJ,y} = EG_{PJ,gross,y} - EG_{PJ,aux,y} \quad \textbf{(4)}$$

Where:
$EG_{PJ,y}$ net quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year *y* (MWh)
$EG_{PJ,gross,y}$ gross quantity of electricity generated in all power plants which are located at the project site and included in the project boundary in year *y* (MWh)

$EG_{PJ,aux,y}$ total auxiliary electricity consumption required for the operation of the power plants at the project site (MWh)

$EG_{PJ,aux,y}$ shall included all electricity required on-site for the operation of equipment related to the preparation, processing, storage and transport of biomass residues (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.) and electricity required for the operation of all power plants which are located at the project site and included in the project boundary (e.g. for pumps, fans, cooling towers, instrumentation and control, etc.).

Step 1.2: Determination of $EF_{BL,EL,y}$

The electricity generated under the project activity could be generated in the baseline in three different ways, depending on the baseline scenario and the particular situation of the project activity:

- **Use of biomass residues at the project site.** Electricity could be generated with biomass residues in power plants at the project site. This applies, for example, if
  (a) The project activity is a replacement of an existing biomass residues fired power plant;
  (b) The project activity is a capacity expansion of an existing biomass residues fired power plant by installing a new biomass residues fired power plant that is operated next to the existing plant;
  (c) The project activity is a fuel switch project activity where some biomass residues have already been used prior to the implementation of the project activity;

AND/OR

- **Use of fossil fuels at the project site.** Electricity could be generated with fossil fuels in power plants at the project site. This applies, for example, if
  (a) The project activity is a fuel switch from fossil fuels to biomass residues;
  (b) In the baseline, a fossil fuel power plant would continue to operate at the project site in parallel with a new biomass residues power plant;

AND/OR

- **Power generation in the electricity grid.** Electricity could be generated by power plants in the electricity grid. This applies, for example, if
  (a) The project activity exports all electricity to the grid and no electricity would be produced at the project site in the baseline;
  (b) The project activity results in an increase of the quantity of electricity produced by power plants included in the project boundary and this increased electricity is exported to the grid or would in the baseline be purchased from the grid.

For some project types, electricity would be generated in the baseline by a combination of these three ways. Therefore, $EF_{BL,EL,y}$ is a weighted average baseline emission factor: it is determined based on each of the three ways electricity could be generated (grid, biomass residues, fossil fuels), multiplied with its respective emission factor over the total amount of electricity produced in the baseline.

In many situations it is difficult to clearly determine the precise mix of grid, biomass residues and fossil fuels based electricity that would be generated in the absence of the project activity. If electricity can be generated in an on-site fossil fuel power plant or can be purchased from the grid, it is particularly challenging to determine how electricity would be generated in the baseline. For example, to what extent an existing coal power plant is dispatched and to what extent electricity is purchased from the grid can depend on the prices for electricity and coal which changes over time.

For this reason, this methodology adopts a conservative approach and defines four different electricity quantities to be used for the calculation of the weighted average baseline emission factor $EF_{BL,EL,y}$. These four different electricity quantities are $EG_{BL,BR,y}$, $EG_{BL,grid,y}$, $EG_{BL,FF,y}$ and $EG_{BL,FF/grid,y}$:

- $EG_{BL,BR,y}$ corresponds to the amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline;
- $EG_{BL,grid,y}$ correspond to the amount of electricity for which it can be clearly identified that it would be generated in the electricity grid in the baseline. For example, the amount of electricity generated under the project activity that exceeds the amount that could be generated with the capacity of the baseline plants operated at the project site could only be generated in the grid in the baseline;
- $EG_{BL,FF,y}$ corresponds to the amount of electricity for which it can be clearly identified that it would be generated in the baseline with fossil fuels at the project site. For example, in the case of a co-fired boiler operated in the baseline, some fossil fuels may need to be fired for technical or operational reasons;
- $EG_{BL,FF/grid,y}$ corresponds to the amount of electricity that could be generated in the baseline either by power plants in the electricity grid or with fossil fuels at the site of the project activity. As it can not be clearly identified which of these two options would be used in the baseline, the lower CO_2 emission factor between the grid emission factor and the emission factor of fossil fuel power plants operated at the site of the project activity is used for this amount of electricity.

Based on this approach, $EF_{BL,EL,y}$ is calculated as follows:

$$EF_{BL,EL,y} = \frac{EG_{BL,FF,y} \cdot EF_{BL,FF,y} + EG_{BL,grid,y} \cdot EF_{grid,CM,y} + EG_{BL,FF/grid,y} \cdot MIN\left(EF_{BL,FF,y}; EF_{grid,CM,y}\right)}{EG_{BL,BR,y} + EG_{BL,FF,y} + EG_{BL,grid,y} + EG_{BL,FF/grid,y}} \quad \textbf{(5)}$$

Where:

$EF_{BL,EL,y}$	emission factor for electricity generation in the baseline in year *y* (tCO_2/ MWh)
$EG_{BL,BR,y}$	amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline year *y* (MWh)
$EG_{BL,FF,y}$	minimum amount of electricity that would be generated with fossil fuels at the project site in the baseline in year *y* (MWh)
$EG_{BL,grid,y}$	minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline year *y* (MWh)
$EG_{BL,FF/grid,y}$	amount of electricity that could be generated in the baseline either by power plants in the electricity grid or by power plants at the project site using fossil fuels in year *y* (MWh)
$EF_{grid,CM,y}$	combined margin CO_2 emission factor for grid-connected electricity generation in year *y* (tCO_2/ MWh)
$EF_{BL,FF,y}$	CO_2 emission factor for electricity generation with fossil fuels in power plant(s) at the project site in the baseline in year *y* (tCO_2/ MWh)

In the following, first the amounts of electricity generated from the various sources in the baseline ($EF_{BL,BR,y}$, $EG_{BL,grid,y}$, $EG_{BL,FF,y}$ and $EG_{BL,FF/grid,y}$) are determined, taking into account the project configuration and the baseline scenario. Therefore, different cases have to be considered. Then the emission factors ($EF_{grid,CM,y}$ and $EF_{BL,FF,y}$) are determined.

Step 1.3: Determination of $EG_{BL,BR,y}$

The amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline ($EG_{BL,BR,y}$) should, in accordance with the baseline scenario and the historical situation before project implementation, be determined as follows:

Case 1: **No power generation with biomass residues in the baseline.** If Scenario B4 does not apply to any biomass residues category (i.e. if no biomass residues would be used for electricity generation in power-only plants in the baseline), then: $EG_{BL,BR,y} = 0$

Case 2: **Power generation with biomass residues in the baseline.** If Scenario B4 applies to all or parts of the biomass residues fired in the power plants (s) included in the project boundary (i.e. if all or parts of the biomass residues would be used in the baseline for electricity generation in power-only plants included in the baseline boundary), then $EG_{BL,BR,y}$ is calculated as follows:

$$EG_{BL,BR,y} = \frac{1}{3.6} \cdot \sum_{n} \sum_{p} \eta_{BL,BR,p} \cdot BR_{BL,n,p,y} \cdot NCV_{n,y} \quad \textbf{(6)}$$

Where:

$EG_{BL,BR,y}$	amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline in year *y* (MWh)
$\eta_{BL,BR,p}$	efficiency of electricity generation of baseline power plant *p* if fired only with biomass residues and not with fossil fuels (ratio)
$BR_{BL,n,p,y}$	quantity of biomass residues of category *n* that would be fired in power-only plant *p* in the baseline in year *y* (tonnes on dry-basis)
$NCV_{n,y}$	net calorific value of biomass residues of category *n* in year *y* (GJ/ tonnes on dry-bases)
n	biomass residues categories
p	power-only plants at the site of the project activity that would (partly) use biomass residues to generated electricity in the baseline

Determination of $BR_{BL,n,p,y}$

Where case 2 above applies, $BR_{BL,n,p,y}$ has to be determined. The determination of $BR_{BL,n,p,y}$ shall be based on the monitored amounts of biomass residues used in power plant included in the project boundary. The biomass residue quantities used should be monitored separately for (a) each type of biomass residues (e.g. rice husks, sugarcane bagasse, empty fruit bunches, etc.) and each source (e.g. produced on-site, obtained from biomass residues suppliers, obtained from a biomass residues market, obtained from an identified biomass residues producer, etc). Note that $BR_{BLn,p,y}$ only includes those biomass residues categories which would also be used in the baseline for electricity generation in power-only plants (i.e. for which B4 is the baseline scenario).

Where the whole amount of biomass residue of one particular type and from one particular source would be used in the baseline in only on clearly identifiable baseline power plant *p*, the monitored quantities of biomass residues used in the project ($BR_{PJ,n,y}$) can be directly allocated to their use in the baseline scenario ($BR_{BL,n,p,y}$).

However, the following situations require particular attention:

- One biomass residue type from one particular source could be used in the baseline in two or more power plants *p* (and not only in one power plant) or in different boilers of that power plant. In this case, the use of this biomass residue type from this source has to be allocated to the different baseline power plants *p* or different boilers should they have a different efficiency;
- One biomass residue type from one particular source could have two different fates in the baseline scenario. This can apply, for example, if parts of one biomass residue type were already collected prior to the implementation of the project activity while another part was not needed

and thus dumped, left to decay or burnt. In this case, it is necessary to allocate the biomass residue quantity used under the project to the following fates in the baseline scenario:

(a) Electricity generation in power-only plants (B4);
(b) Dumping, leaving to decay or burning (B1, B2 and/or B3); or
(c) As required for the purpose of calculating leakage effects: other fates (B5, B6, B7 and/or B8).

Where one of these arises, the project participant should specify and justify in the CDM-CPA-DD in a transparent manner how the relevant allocations should be made and how $BR_{BL,n,p,y}$ should be determined for the relevant biomass residue category *n* and each power plant *p* based on the monitored quantities. The approaches used should be consistent with the identified baseline scenario and reflect the particular situation or the underlying project activity. In doing so, the following allocation rules should be adhered to:

- The sum of biomass residues used in the baseline in all power plants *p* shall correspond to the total amount of biomass residues which are used under the project activity and for which the baseline scenario is B4:

$$\sum_n \sum_p BR_{BL,n,p,y} = \sum_n BR_{PJ,n,y} \quad \textbf{(7)}$$

Where:

$BR_{BL,n,p,y}$	quantity of biomass residues of category *n* that would be fired in power-only plant *p* in the baseline in year *y* (tonnes on dry-basis)
$BR_{PJ,n,y}$	quantity of biomass residues of category *n* used in power plants which are located at the project site and included in the project boundary in year *y* (tonnes on dry-basis)
n	biomass residues categories for which B4 is the baseline scenario
p	power-only plants at the site of the project activity that would (partly) use biomass residues to generated electricity in the baseline

- The allocation of biomass residue should be undertaken in a conservative manner. This means that in case of uncertainty an allocation rule should favour the option that results in lower emission reductions;
- If several biomass residue plants *p* or several boiler supplying one power plant would operated in the baseline and if it is technically feasible to use a biomass residue type in different power plants *p* or boilers, one of the following two approaches should be applied:
  (a) Assume the most efficient operation mode which results in the greatest amount of electricity generation from biomass residues. For example, it should be assume that first those biomass residues types, boilers and power plant *p* would be used that yield the highest efficiency of power generation, taking into account technical constraints, and that subsequently less efficient biomass residue types of equipment would be used;
  (b) Choose for the determination of $\eta_{BL,BR,p}$ below the same conservative default efficiency for all power plants *p* that would be operated in the baseline at the project. In this case, no allocation of biomass residues to different power plants is required
- In the case a biomass residues type from one particular source has been used prior to the implementation of the project activity partly in power-only plants operated at the project site (scenario B4) and partly has been dumped, left to decay or burnt (scenarios B1, B2, B3) and if this situation would continue in the baseline scenario, then use, as a conservative approach to address the uncertainty associated with such an allocation, the maximum value among the following two approaches for the quantity of biomass residue allocated to scenario B4:

(a) The highest annual historical use of that biomass residue type from that source in power-only plants operated at the project site observed in the most recent three calendar years prior to the implementation of the project activity; and
(b) In the case of projects that use biomass residues from a on-site production process (e.g. production of sugar cane or rice), calculated as follows:

$$BR_{PJ,n,B4,y} = P_y \cdot MAX\left\{\frac{BR_{n,power-only,x}}{P_x}; \frac{BR_{n,power-only,x-1}}{P_{x-1}}; \frac{BR_{n,power-only,x-2}}{P_{x-2}}\right\} \quad \textbf{(8)}$$

Where:

$BR_{PJ,n,B4,y}$	quantity of biomass residues of category *n* used in year *y* in power-only plants which are located at the project site and included in the project boundary and for which B4 is the baseline scenario (tonnes on dry-basis)
$BR_{n,power-only,x}$	quantity of biomass residues of category *n* used in year *x* in power-only plants which were used at the project site prior to the implementation of the project activity (tonnes on dry –basis)
P_y	quantity of the main product of the production process (e.g. sugar cane, rice) produced in year *y* from plants operated at the project site
P_x	quantity of the main product of the production process (e.g. sugar cane, rice) produced in year *x* from plants operated at the project site
x	last calendar year prior to the start of the crediting period
n	biomass residues type from one particular source for which the baseline scenario is partly B4 and partly B1/B2/B3 is the baseline scenario

Determination of $\eta_{BL,BR,p}$

This methodology covers situations where a power plant *p* includes different heat generators which can used different fuel types and which operation in parallel, supplying heat to a common heat header, as well as several heat engines with different efficiencies that that also operate in parallel and all used heat from the common heat header. Therefore, the definition of a single efficiency of electricity generation for a baseline power plant *p* is challenging, and a simplified and conservative approach (i.e. an approach that tends to overestimate $\eta_{BL,BR,p}$) is taken.

The parameter $\eta_{BL,BR,p}$ should be calculated using one of the following options for each power plant *p*:

Option 1: Default values. Use the following conservative default values:
(a) For existing plants operated at the project site prior to the implementation of the project activity: $\eta_{BL,BR,p} = 0.37$;
(b) For new plants that would be in the baseline scenario be constructed and operated at the project site: $\eta_{BL,BR,p} = 0.39$.

Option 2: Manufacturer's data. This option is only applicable to plants that were operated at the project site prior to the implementation of the project activity (and not new plants that would be constructed and operated at the project site in the baseline scenario). The overall efficiency of the plant is determined based on manufacturer's data of the efficiency of the main components under optimal operating conditions, as follows:

$$\eta_{BL,BR,p} = \eta_{BL,hg,p} \cdot \eta_{BL,mg,p} \cdot \eta_{BL,eg,p} \quad \textbf{(9)}$$

Where:

$\eta_{BL,BR,p}$ efficiency of electricity generation of baseline power plant *p* if fired only with biomass residues and not with fossil fuels (ratio)

$\eta_{BL,hg,p}$ conservative efficiency of heat generation of baseline power plant *p* if fired only with biomass residues and not with fossil fuels (ratio)

$\eta_{BL,mg,p}$ conservative efficiency of conversion from heat to mechanical shaft power of baseline power plant *p* (ratio)

$\eta_{BL,eg,,p}$ conservative efficiency of the electric generators of baseline power plant *p* (ratio)

For any of the parameters $\eta_{BL,hg,p}$, $\eta_{BL,mg,p}$ and $\eta_{BL,eg,,p}$, if several heat generators, heat engines and electric generators would operate in the baseline and if it can not clearly defined which configuration would prevail in the baseline, the most conservative values for efficiencies should be assumed in determining $\eta_{BL,BR,p.}$ For example, if several boilers, turbines, speed reducers and electric generators operate in the power plant *p*, it should be assumed that the most efficient boiler and the most efficient set of turbine-speed reducer-electric generator would be used the efficiency of conversion from heat to mechanical shaft power should included the speed-reducers or gear boxes required to couple the mechanical shaft power generator to the electric generator.

Option 3: **Historical records.** This option is only applicable to plants that were operated at the project site for at least three calendar years prior to the implantation of the project activity. The overall efficiency of a plant *p* is determined based on the historical quantity of biomass residues used in the plant and electricity generation of the plant, as follows:

$$\eta_{BL,BR,p} = MAX\left\{\frac{EG_{BR,p,x}}{\sum_n BR_{n,p,x}\cdot NCV_{n,x}}; \frac{EG_{BR,p,x-1}}{\sum_n BR_{n,p,x-1}\cdot NCV_{n,x-1}}; \frac{EG_{BR,p,x-2}}{\sum_n BR_{n,p,x-2}\cdot NCV_{n,x-2}}\right\} \quad \textbf{(10)}$$

Where:

$\eta_{BL,BR,p}$ efficiency of electricity generation of baseline power plant *p* if fired only with biomass residues and not with fossil fuels (ratio)

$EG_{BR,p,x}$ net quantity of electricity generated from using biomass residues in power plant *p* in year *x* (MWh/ yr)

$BR_{n,p,x}$ quantity of biomass residues of category *n* used in year *x* in power plant *p* (tonnes on dry-basis)

$NCV_{n,x}$ net calorific value of biomass residue category *n* in year *x* (GJ/ tons on dry-basis)

p power-only plant(s) operated at the project site prior to the implementation of the project activity

x last calendar year prior to the start of the crediting period

n biomass residue categories used for power generation at the project site in years *x*, *x-1* and *x-2*

If only biomass residues and no fossil fuels were used for electricity generation in the power plant *p* prior to the implementation of the project activity, then $EG_{BR,p,x}$, $EG_{BR,p,x-1}$ and $EG_{BR,p,x-2}$ can be obtained directly from historical electricity generation records ($EG_{BR,p,x} = EG_{p,x}$; $EG_{p,x-1} = EG_{BR,p,x-1}$; $EG_{BR,p,x-2}$, = $EG_{p,x}$-2).

If fossil fuels and biomass residues were used for electricity generation in power plant *p* prior to the implementation of the project activity, then $EG_{BR,p,x}$, $EG_{BR,p,x-1}$ and $EG_{BR,p,x-2}$ are determined as follows:

$$EG_{BR,p,x} = EG_{p,x}\cdot\frac{\sum_n BR_{n,p,x}\cdot NCV_{n,x}}{\sum_n BR_{n,p,x}\cdot NCV_{n,x} + \sum_m FF_{m,p,x}\cdot NCV_{m,x}} \quad \textbf{(11)}$$

Where:

$EG_{BR,p,x}$ net quantity of electricity generated from using biomass residues in power plant *p* in year *x* (MWh/ yr)

$EG_{p,x}$ net quantity of electricity generated in power plant *p* in year *x* (MWh/ yr)

$BR_{n,p,x}$ quantity of biomass residues of category *n* used in year *x* in power plant *p* (tonnes in dry –basis)

$NCV_{n,x}$ net calorific value of biomass residue category *n* in year *x* (GJ/tons on dry-basis)

$FF_{m,p,x}$ quantity of fossil fuel type *m* fired in power plant *p* in year *x* (mass or volume unit/ yr)

$NCV_{m,x}$ net calorific value of fossil fuel type *m* in year *x* (GJ/mass or volume unit)

m fossil fuel types used in the power plants *p* in years *x, x-1* and *x-2*

p power plants that are operated at the site of the project activity, included in the project boundary, and (partially) fired with fossil fuels in the years *x, x-1* and *x-2*

x last calendar year prior to the start of the crediting period

Option 4: Determination of a benchmark for the baseline efficiency. Use the average efficiency of the top 20% performing biomass residue power-only plants in the relevant region among the plants that were built in the most recent five calendar years prior to the implementation of the project activity. The region should be defined in a manner that it includes at least ten plants.

Step 1.4: Determination of $EG_{BL,FF,y}$

The minimum amount of electricity that would be generated with fossil fuels at the project site in the baseline in year y ($EG_{BL,FF,y}$) should, in accordance with the baseline scenario and the historical situation before project implementation, be determined as follows:

Case 1: No use of fossil fuels in the baseline. This case applies if no fossil fuels would be used for electricity generation in the baseline scenario at the project site. In this case, $EG_{BL,FF,y} = 0$.

Case 2: No connection to the electricity grid. This case applies if all power plants included in the project boundary are off-grid power plants. In this case, the electricity generated by the project can only displace on-site electricity generation with fossil fuel and/or biomass residues ($EG_{PJ,y} = EG_{BL,FF,y} + EG_{BL,BR,y}$). Accordingly, $EG_{BL,FF,y}$ is calculated as follows:

$$EG_{BL,FF,y} = EG_{PJ,y} - EG_{BL,BR,y} \quad \textbf{(12)}$$

Where:

$EG_{BL,FF,y}$ minimum amount of electricity that would be generated with fossil fuels at the project site in the baseline in year *y* (MWh)

$EG_{PJ,x}$ electricity generated in power plants included in the project boundary in year *y* (MWh/yr)

$EG_{BL,BR,y}$ amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline in year *y* (MWh/yr)

Case 3: Grid connection and historical use of fossil fuels. This case applies if

(a) At least one power plant included in the project boundary is not an off-grid plant;
(b) Fossil fuels were used for power generation at the project site at any point in time during the most recent three calendar years prior to the implementation of the project activity; and
(c) The baseline scenario is the continued use of fossil fuels for power generation at the project site either in existing or new (co-fired) power plant(s) at the project site which is/are (co-)fired with fossil fuels

In this case, it is assumed that at least the lowest annual amount of fossil fuel use during the most recent three years would continue to be used for electricity generation in the baseline. $EG_{BL,FF,y}$ is then determined as the lowest annual amount of electricity generation with fossil fuels during the most recent three years prior to the implantation of the project activity, as follows:

$$EG_{BL,FF,y} = MIN\left(EG_{FF,x}; EG_{FF,x-1}; EG_{FF,x-2}\right) \quad \textbf{(13)}$$

Where:

$EG_{BL,FF,y}$	minimum amount of electricity that would be generated with fossil fuels at the project site in the baseline in year *y* (MWh/yr)
$EG_{FF,x}$	electricity generation with fossil fuels in power plant(s) operated in year *x* at the project site and included in the project boundary (MWh/yr)
$EG_{FF,x-1}$	electricity generation with fossil fuels in power plant(s) operated in year *x-1* at the project site and included in the project boundary (MWh/yr)
$EG_{FF,x-2}$	electricity generation with fossil fuels in power plant(s) operated in year *x-2* at the project site and included in the project boundary (MWh/yr)
x	last calendar year prior to the start of the crediting period

If only fossil fuels and no biomass residues were used for electricity generation at the project site prior to the implementation of the project activity, then $EG_{FF,x}$, $EG_{FF,x-1}$ and $EG_{FF,x-2}$, can be obtained directly from historical electricity generation records.

If fossil fuels and biomass residues were used for electricity generation at the project site prior to the implementation of the project activity, then $EG_{FF,x}$, $EG_{FF,x-1}$ and $EG_{FF,x-2}$, are determined as follows:

$$EG_{FF,x} = \sum_m \sum_p \eta_{p,FF} \cdot \frac{1}{3.6} \cdot FF_{m,p,x} \cdot NCV_{m,x} \quad \textbf{(14)}$$

Where:

$EG_{FF,x}$	electricity generation with fossil fuels in power plant(s) operated in year *x* at the project site and included in the project boundary (MWh/yr)
$\eta_{p,FF}$	efficiency of electricity generation of power plant *p* if fired only with fossil fuels and not with biomass residues
$FF_{m,p,x}$	quantity of fossil fuel type *m* fired in power plant *p* in year *x* (mass or volume unit/yr)
$NCV_{m,x}$	net calorific value of fossil fuel type *m* in year *x* (GJ/mass or volume unit)
m	fossil fuel types used in the power plant *p* in years *x, x-1* and *x-2*
p	power plants operating at the site of the project activity, included in the project boundary, and (partially) fired with fossil fuels in the years *x, x-1* and *x-2*
x	last calendar year prior to the start of the crediting period

Case 4: Grid connection, no historical use of fossil fuels, and construction of a new power plant (co-)fired with fossil fuels in the baseline scenario.

This case applies if:

(a) At least one power plant included in the project boundary is not an off-grid plant;
(b) No fossil fuels were used for power generation at the project site during the most recent three years prior to the implementation of the project activity; and
(c) The baseline scenario is the construction of new power plant(s) at the project site which is/are (co-)fired with fossil fuels.

In this case, it is difficult to establish a reasonable minimum amount of electricity hat would be generated with fossil fuel at the project site. The project activity could displace electricity in both on-site fossil fuel fired power plants or in the grid. To what extent the on-site power plant(s) is/are dispatched and to what extent grid electricity is used could depend on several parameters, including the price of electricity, the price of the fossil fuels, the on-site demand for electricity and/or the reliability of the grid. However, all these parameters may change during the crediting period.

For this reason, the following conservative approach is taken:

- If the new power plant constructed in the baseline scenario would only use fossil fuels and not co-fire any biomass residues, then $EG_{BL,FF,y} = 0$. This implies that the amount of electricity that could displace on-site electricity generation with fossil fuels is allocated to $EG_{BL,FF/grid,y}$;
- If the new power plant constructed in the baseline scenario would co-fire fossil fuels and biomass residues, then $EG_{BL,FF,y}$ should correspond to the minimum amount of fossil fuels that must be used due to technical or operational constraints to operate the power plant. This quantity should be determined based on the technical specifications obtained from manufacturers. The determination of this amount should be transparently documented and explained in the CDM-CPA-DD. Otherwise, if there are no technical constraints, if these cannot be demonstrated or if the project participant do not wish to determined a minimum amount, it should be assumed that $EG_{BL,FF,y} = 0$.

Step 1.5: Determination of $EG_{BL,grid,y}$

The minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline ($EG_{BL,grid,y}$) should, in accordance with the baseline scenario, be determined as follows:

Case 1: No connection to the electricity grid. If all power plants included in the project boundary are off-grid power plant, then the project does not displace grid electricity and $EG_{BL,grid,y} = 0$

Case 2: No electricity generation at the project site in the baseline. If no power plant would be operating at the project site in the baseline, the all electricity generated by the project displaces grid electricity, and $EG_{BL,grid,y} = EG_{PJ,y}$

Case 3: Use of only biomass residues for electricity generation at the project site in the baseline. If only biomass residue and no fossil fuels would be used for electricity generation at the project site in the baseline, then the electricity generated by the project displaces grid electricity and electricity generated with biomass residues ($EG_{PJ,y} = EG_{BL,grid,y} + EG_{BL,BR,y}$). Accordingly, $EG_{BL,grid,y}$ is calculated as follows:

$$EG_{BL,grid,y} = EG_{PJ,y} - EG_{BL,BR,y} \quad \textbf{(15)}$$

Where:

$EG_{BL,grid,y}$	minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year *y* (MWh/yr)
$EG_{PJ,y}$	electricity generated in power plants included in the project boundary in year *y* (MWh/yr)
$EG_{BL,BR,y}$	amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline in year *y* (MWh/yr)

Case 4: Use of only fossil fuels for electricity generation at the project site in the baseline. If only fossil fuels and no biomass residues would be used for electricity generation at the project site in

the baseline, then the electricity generated by the project can displace grid electricity and electricity generated with fossil fuels at the project site.

$EG_{BL,grid,y}$ represents the amount of electricity that could be generated in on-site power plant(s) using fossil fuels and would have to be supplied by the grid. This applies to the amount of electricity generated in the project activity that exceeds the maximum amount of electricity that could be generated with fossil fuels at the project site in the baseline ($EG_{BL,MAX,FF}$). Accordingly, $EG_{BL,grid,y}$ is calculated as follows:

$$EG_{BL,grid,y} = \begin{cases} EG_{PJ,y} - EG_{BL,MAX,FF} & \text{if } EG_{PJ,y} > EG_{BL,MAX,FF} \\ 0 & \text{if } EG_{PJ,y} \leq EG_{BL,MAX,FF} \end{cases} \quad \textbf{(16)}$$

Where:

$EG_{BL,grid,y}$ minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year *y* (MWh/yr)

$EG_{PJ,y}$ electricity generated in power plants included in the project boundary in year *y* (MWh/yr)

$EG_{BL,MAX,FF,y}$ maximum amount of electricity that could be generated with fossil fuels at the project site in the baseline (MWh/yr)

Case 5: Use of fossil fuels and biomass residues for electricity generation at the project site in the baseline. If biomass residues and fossil fuels would be used for electricity generation at the project site in the baseline, then the electricity generated by the project can displace grid electricity, electricity generated with fossil fuels at the project site and electricity generated with biomass residues at the project site. The following scenarios can occur:

(a) **Use of all biomass residues in co-fired heat generator(s).** All biomass residues that would be used in the baseline for electricity generation would be co-fired with fossil fuels. In this case, $EG_{BL,grid,y}$ corresponds to the amount of electricity generated in the project activity that exceeds the maximum amount of electricity generation that could be generated by co-firing fossil fuels and biomass residues in plants at the project site in the baseline ($EG_{BL,MAX,FF/BR}$). Accordingly, $EG_{BL,grid,y}$ is calculated as follows:

$$EG_{BL,grid,y} = \begin{cases} EG_{PJ,y} - EG_{BL,MAX,FF/BR,y} & \text{if } EG_{PJ,y} > EG_{BL,MAX,FF/BR,y} \\ 0 & \text{if } EG_{PJ,y} \leq EG_{BL,MAX,FF/BR,y} \end{cases} \quad \textbf{(17)}$$

Where:

$EG_{BL,grid,y}$ minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year *y* (MWh/yr)

$EG_{PJ,y}$ electricity generated in power plants included in the project boundary in year *y* (MWh/yr)

$EG_{BL,MAX,FF/BR,y}$ maximum amount of electricity that could be generated with fossil fuels and any co-firing of biomass residues at the project site in the baseline in year y (MWh/yr)

(b) **Use of all biomass residues in biomass residues only heat generator(s).** All biomass residues that would be used in the baseline for electricity generation would be used in eh heat generator(s) that use only biomass residues and no fossil fuels. In this case, $EG_{BL,grid,y}$ is determined as follows:

$$EG_{BL,grid,y} = \begin{cases} EG_{PJ,y} - EG_{BL,BR,y} - EG_{BL,MAX,FF} & \text{if } EG_{PJ,y} > (EG_{BL,BR,y} + EG_{BL,MAX,FF}) \\ 0 & \text{if } EG_{PJ,y} \leq (EG_{BL,BR,y} + EG_{BL,MAX,FF}) \end{cases} \quad \textbf{(18)}$$

Where:

$EG_{BL,grid,y}$ minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year *y* (MWh/yr)

$EG_{PJ,y}$ electricity generated in power plants included in the project boundary in year *y* (MWh/yr)

$EG_{BL,BR,y}$ amount of electricity that would be generated with biomass residues in power-only plant operated at the project site in the baseline in year *y* (MWh/yr)

$EG_{BL,MAX,FF,y}$ maximum amount of electricity that could be generated with fossil fuels at the project site in the baseline (MWh/yr)

(c) **Use of biomass residues in both biomass residues only heat generator(s) and co-fired heat generator(s).** The biomass residues that would be sued in the baseline for electricity generation would partially be co-fired in fossil fired heat generator(s) and partially be used in heat generator(s) that use only biomass residues. This case, the project participants should document and justify in the CDM-CPA-DD what quantities of which types of biomass residues would be used in each type of heat generator, ensuring that:

$$\sum_n \sum_p BR_{BL,n,p,y} = BR_{BL,BR-only,y} + BR_{BL,co-fired,y} \quad \textbf{(19)}$$

Where:

$BR_{BL,n,p,y}$ quantity of biomass residues of category *n* that would be fired in power-only plant *p* in the baseline in year *y* (tonnes on dry basis)

$BR_{BL,BR\text{-}only,y}$ quantity of biomass residues that would be fired in biomass-residue-only heat generators (of power-only plants) in the baseline in year *y* (tonnes on dry-basis)

$BR_{BL,co\text{-}fired,y}$ quantity of biomass residues that would be fired in co-fired heat generators (of power-only plants) in the baseline in year *y* (tonnes on dry-basis)

When $EG_{BL,grid,y}$ corresponds to the amount of electricity generated in the project activity that exceeds the maximum amount of electricity generation that could be generated by co-firing fossil fuels and biomass residues in plants at the project site in the baseline ($EG_{BL,MAX,FF/BR,y}$) and by firing biomass residues in biomass residues only heat generators ($EG_{BL,BR\text{-}only,y}$). Accordingly, $EG_{BL,grid,y}$ is calculated as follows:

$$EG_{BL,grid,y} = \begin{cases} EG_{PJ,y} - EG_{BL,BR\text{-}only,y} - EG_{BL,MAX,FF/BR,y} & \text{if } EG_{PJ,y} > (EG_{BL,BR\text{-}only,y} + EG_{BL,MAX,FF/BR,y}) \\ 0 & \text{if } EG_{PJ,y} \leq (EG_{BL,BR\text{-}only,y} + EG_{BL,MAX,FF/BR,y}) \end{cases} \quad \textbf{(20)}$$

Where:

$EG_{BL,grid,y}$ minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year *y* (MWh/yr)

$EG_{PJ,y}$ electricity generated in power plants included in the project boundary in year *y* (MWh/yr)

$EG_{BL,BR\text{-}only,y}$ amount of electricity that would be generated with biomass-residue-only heat generators at the project site in the baseline in year *y* (MWh/yr)

$EG_{BL,MAX,FF/BR,y}$ maximum amount of electricity that could be generated with fossil fuels and any co-firing of biomass residues at the project site in the baseline in year *y* (MWh/yr)

The parameter $EG_{BL,BR\text{-}only,y}$ should be estimated based on the parameter $BR_{BL,BR\text{-}only,y}$ and the corresponding efficiency of power generation.

Determination of $EG_{BL,MAX,FF,y}$

$EG_{BL,MAX,FF,y}$ corresponds to the maximum amount of electricity that could be generated with fossil fuels at the project site in the baseline. This parameter needs to be determined if fossil fuels would be used for electricity generation at the project site in the baseline. $EG_{BL,MAX,FF,y}$ is determined as follows:

$$EG_{BL,MAX,FF,y} = \sum_{n} CAP_{FF,p} \cdot 0.9 \cdot 8{,}760 \cdot \text{hours / yr} \quad \textbf{(21)}$$

Where:

$EG_{BL,MAX,FF,y}$	maximum amount of electricity that could be generated with fossil fuels at the project site in the baseline in year *y* (MWh/yr)
$CAP_{FF,p}$	maximum electricity generation capacity of baseline power plant *p* if fired only with fossil fuels (MW)
p	power-only plants that would operate at the project site in the baseline scenario

Determination of $EG_{BL,MAX,FF/BR,y}$

$EG_{BL,MAX,FF/BR,y}$ corresponds to the maximum amount of electricity that could be generated with fossil fuels and any co-firing of biomass residues at the project site in the baseline in year *y* (MWh/yr). This parameter needs to be determined if fossil fuels and biomass residues would be co-fired in heat generators of any power plant that would be used for electricity generation at the project site in the baseline. $EG_{BL,MAX,FF/BR,y}$ is determined as follows:

$$EG_{BL,MAX,FF/BR,y} = \sum_{n} CAP_{FF/BR,p,y} \cdot 0.9 \cdot 8{,}760 \cdot \text{hours / yr} \quad \textbf{(22)}$$

Where:

$EG_{BL,MAX,FF/BR,y}$	maximum amount of electricity that could be generated with fossil fuels and any co-firing of biomass residues at the project site in the baseline in year *y* (MWh/yr)
$CAP_{FF/BR,p}$	maximum electricity generation capacity of baseline power plant *p* in year *y* if fossil-fuel-only heat generators and co-fired heat generators are used (MW)
p	power-only plants that would operate at the project site in the baseline scenario

$CAP_{FF/BR,p}$ should be based on the maximum heat quantity that can be generated for use in heat engines if fossil-fuel-only heat generators and co-fired heat generators are used (but no biomass-residue-only heat generators). Note that $CAP_{FF/BR,p}$ depends on the amount of biomass residues co-fired in heat generators of the power plant. it is therefore determined based on the monitored amounts of biomass resides that would be co-fired in heat generators in year *y* ($BR_{BL,co\text{-}fired,y}$). project participant will document transparently and justify in the CDM-CPA-DD how they determine $CAP_{FF/BR,p}$ as a function of $BR_{BL,co\text{-}fired,y}$ for each calendar year.

Alternatively, as a conservative approach, the following can be assumed: $EG_{BL,MAX,FF/BR,y} = EG_{BL,MAX,FF}$

Step 1.6: Determination of $EG_{BL,FF/grid,y}$

$EG_{BL,FF/grid,y}$ represents the amount of electricity that could be generated in the baseline in the grid or at the project site using fossil fuels. $EG_{BL,FF/grid,y}$ corresponds to the remainder of electricity generation, i.e. the amount that exceeds the minimum amount of electricity that would be generated by power plants in the electricity grid ($EG_{BL,grid,y}$), the minimum amount of electricity that could be generated with fossil

fuels at the project site ($EG_{BL,FF,y}$), and the amount of electricity that would be generated with biomass residues at the project site ($EG_{BL,BR,y}$). Accordingly, $EG_{BL,FF/grid,y}$ is calculated as follows:

$$EG_{BL,FF/grid,y} = EG_{PJ,y} - EG_{BL,BR,y} - EG_{BL,FF,y} - EG_{BL,grid,y} \quad \textbf{(23)}$$

Where:

$EG_{BL,FF/grid,y}$	amount of electricity that could be generated in the baseline either by power plants in the electricity grid or by power plants at the project site using fossil fuels in year *y* (MWh)
$EG_{PJ,y}$	electricity generated in power plants included in the project boundary in year *y* (MWh)
$EG_{BL,BR,y}$	amount of electricity that would be generated with biomass residues in power-only plants operated at the project site in the baseline in year *y* (MWh)
$EG_{BL,FFy}$	minimum amount of electricity that would be generated with fossil fuels at the project site in the baseline in year *y* (MWh)
$EG_{BL,grid,y}$	minimum amount of electricity that would be generated by power plants in the electricity grid in the baseline in year y (MWh)

Step 1.7: Determination of $EF_{BL,FF,y}$

$EF_{BL,FF,y}$ should be determined using Option A or Option B below. If fossil fuel power plants were operated at the project site prior to the implementation of the project activity, either option A or option B can be used to determine $EF_{BL,FF,y}$. For new power plants that would be constructed at the project site in the baseline scenario, Option B is used.

Option A: Determine $EF_{BL,FF,y}$ as per the procedure described under "Scenario B: Electricity consumption from an off-grid captive power plant" in the latest approved version of the "Tool to calculate baseline, project and/or leakage emission from electricity consumption" version 01 (versions which may be updated, as necessary), using data from three calendar years prior to the implantation of the project activity.

Option B: Determine a default emission factor for $EF_{BL,FF,y}$ based on a default efficiency of the power plant that would be operated at the project site in the baseline and a default CO_2 emission factor for the fossil fuel types that would be used, as follows:

$$EF_{BL,FF,y} = 3.6 \cdot \frac{EF_{BL,CO2,FF}}{\eta_{BL,FF}} \quad \textbf{(24)}$$

Where:

$EF_{BL,FF,y}$	CO_2 emission factor for electricity generation with fossil fuels in power plant(s) at the project site in the baseline year y (tCO_2/ MWh)
$EF_{BL,CO2,FF}$	CO_2 emission factor of the fossil fuel type that would be used for power generation at the project site in the baseline (tCO_2/ GJ) [4]
$\eta_{BL,FF}$	efficiency of the fossil fuel power plant(s) at the project site in the baseline

Step 1.8: Determination of $EF_{grid,CM,y}$

$EF_{grid,CM,y}$ is determined as the combined margin CO_2 emission factor for grid connected power generation in year y, calculated using the latest approved version of the "Tool to calculate the emission factor for an electricity system" version 02.2.1 (versions which may be updated, as necessary).

[4] 2006 IPCC Guidelines for National Gas Inventories: Reference Manual; Volume 2, Chapter 1, Table 1-4

Step 2: Determination of baseline emissions due to uncontrolled burning or decay of biomass residues ($BE_{BR,y}$)

The calculation of baseline emissions dues to uncontrolled burning or decay of biomass residues is optional and project participant can decide whether to include these emission sources or not. If project participant wish to include these emission sources, the procedure below should be followed, and emissions from combustion of biomass residues under the project activity should be also be determined. Otherwise, this section does not need to be applied and project emissions do no need to include emissions from the combustion of biomass residues under the project activity.

Baseline emissions due to uncontrolled burning or decay of biomass residues are only determined for those categories of biomass residues for which B1, B2 or B3 has been identified as the most plausible baseline scenario. The guidance for the determination of $BR_{BL,n,p,y}$ should be considered in determining the quantities of biomass residues for each biomass residue category.

The emissions are determined separately for biomass residues categories for which scenarios B1 and B3 (aerobic decay or uncontrolled burning) apply, and for biomass residues categories for which scenario B2 (anaerobic decay) apply:

$$BE_{BR,y} = BE_{BR,B1/B3,y} + BE_{BR,B2,y} \quad \textbf{(25)}$$

Where:

$BE_{BR,y}$	baseline emissions due to uncontrolled burning or decay of biomass residues in year *y* (tCO_2)
$BE_{BR,B1/B3,y}$	baseline emissions due to aerobic decay or uncontrolled burning of biomass residues in year *y* (tCO_2)
$BE_{BR,B2,y}$	baseline emissions due to anaerobic decay of biomass residues in year *y* (tCO_2)

Step 2.1: Determination of $BE_{BR,B1/B3,y}$

For the biomass residues categories for which the most likely baseline scenario is either that the biomass residues would be dumped or left to decay under mainly aerobic conditions (B1), or burnt in an uncontrolled manger without utilizing them for energy purposes (B3), baseline emissions are calculated assuming, for both scenarios (aerobic decay and uncontrolled burning), that the biomass residues would be burnt in an uncontrolled manner.

Baseline emissions are calculated by multiplying the quantity of biomass residues with the net calorific value and an appropriate emission factor, as follows:

$$BE_{BR,B1/B3,y} = GWP_{CH4} \cdot \sum_{n} BR_{n,B1/B3,y} \cdot NCV_{n,y} \cdot EF_{BR,n,y} \quad \textbf{(26)}$$

Where:

$BE_{BR,B1/B3,y}$	baseline emissions due to uncontrolled burning or anaerobic decay of biomass residues in year *y* (tCO_2)
GWP_{CH4}	global warming potential of methane valid for the commitment period (tCO_2/ tCH_4)
$BR_{n,B1/B3,y}$	amount of biomass residues category *n* used in the project plant(s) included in the project boundary in year *y* for which B1 or B3 has been identified as the most plausible baseline scenario (tonnes on dry-basis)
$NCV_{n,y}$	net calorific value of the biomass residues category *n* in year *y* (GJ/tonnes on dry-basis)

$EF_{BR,n,y}$ CH_4 emission factor for uncontrolled burning of the biomass residues category *n* during the year *y* (tCH_4/GJ)
n categories of biomass residues

To determine the CH_4 emission factor, project participant may undertake measurements or use referenced default values. In the absence of more accurate information, it is recommended to use 0.0027 tCH_4 per ton of biomass as default value for the product of NCV_k and $EF_{burning,CH4,k,y}$[5]

The uncertainty of the CH_4 emission factor ($EF_{BR,n,y}$) is in many cases relatively high. In order to reflect this and for the purpose of providing conservative estimates of emission reductions, a conservativeness factor must be applied to the CH_4 emission factor. The level of the conservativeness factor depends on the uncertainty range of the estimate for the CH_4 emission factor. The appropriate conservativeness factor from Table 2 below shall be chosen and multiplied with the estimate for the CH_4 emission factor. For example, if the default CH_4 emission of 0.0027 tCH_4/t biomass is used, the uncertainty can be deemed to be greater than 100%, resulting in a conservativeness factor of 0.73. Thus, in this case an emission factor of 0.001971 tCH4/t biomass should be used.

Conservativeness factors, as per Table 3 of ACM0018 ver. 02.0.0

Estimated uncertainty range (%)	Assigned uncertainty band (%)	Conservativeness factor where lower values are more conservative
Less than or equal to 10	7	0.98
Greater than 10 and less than or equal to 30	20	0.94
Greater than 30 and less than or equal to 50	40	0.89
Greater than 50 and less than or equal to 100	75	0.82
Greater than 100	150	0.73

Step 2.2: Determination of $BE_{BR,B2,y}$

For the biomass residues categories, for which the most likely baseline scenario is that the biomass residues would decay under clearly anaerobic conditions (case B2), project participants shall calculate baseline emissions using the latest approved version of the "Emissions from solid waste disposal sites" version 06.0.1(versions which may be updated, as necessary) . The variable $BE_{CH4,SWDS,y}$ calculated by the tool corresponds to $BE_{BR,B2,y}$ in this methodology. The project participant shall use as waste quantities prevented from disposal ($W_{j,x}$) in the tool, those quantities of biomass residues ($BR_{n,B2,y}$) for which B2 has been identified as the most plausible baseline scenario.

The determination of $BR_{n,B2,y}$ shall be based on the monitored amounts of biomass residues used in power plant included in the project boundary. Where all biomass residues with the baseline scenario B2 come from one particular source, the monitored quantities of biomass residues used from the source in the project plant ($BR_{PJ,n,y}$) can be directly used. Where only parts of the biomass residues form one source would be dumped under clearly anaerobic conditions (B2), an allocation should be made. The allocation should be in a conservative manner and consistent with the guidance provided before for $BR_{BL,n,p,y}$. The project participants would specify and justify in the CDM-CPA-DD in a transparent manner how the relevant allocations should be made and how $BR_{n,B2,y}$ should be determined for the relevant biomass

[5] 2006 IPCC Guidelines, Volume 4, table 2.5, default value for agricultural residues

residue category *n* based on the monitored quantities. The approaches used should be consistent with the identified baseline scenario and reflect the particular situation of the underlying project activity.

Project Emissions

Project emissions are calculated as follows:

$$PE_y = PE_{FF,y} + PE_{EL,y} + PE_{TR,y} + PE_{BR,y} + PE_{WW,y} \quad \textbf{(27)}$$

Where:

PE_y project emissions during the year *y* (tCO_2e)
$PE_{FF,y}$ emissions during the year *y* due to fossil fuel consumption (tCO_2)
$PE_{FF,y}$ emissions during the year *y* due to electricity use off-site for the processing of biomass residues (tCO_2)
$PE_{TR,y}$ emissions during the year *y* due to transport of the biomass residues to the project plant (tCO_2)
$PE_{BR,y}$ emissions from the combustion of biomass residues during the year *y* (tCO_2e)
$PE_{ww,y}$ emissions from wastewater generated from the treatment of biomass residues in year *y* (tCO_2e)

Determination of $PE_{ff,y}$

The following emission sources should be included in determining $PE_{FF,y}$:

- Emissions from on-site fossil fuel consumption for the generation of electric power. This includes all fossil fuels used at the project site in heat generator (e.g. boilers) for the generation of electric power; and
- Emissions from on-site fossil fuel consumption of auxiliary equipment and systems related to the generation of electric power. This includes fossil fuels required for the operation of auxiliary equipment related to the power plants (e.g. for pumps, fans, cooling towers, instrumentation and control, etc.) which are not accounted in the first bullet, and
- Fossil fuels required for the operation of equipment related to the on-site or off-site preparation, storage, processing and transportation of fuels and biomass residues (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.).
- If any fossilized or non-biodegradable materials are used in the processing of biomass residues and incorporated in the processes biomass residues (e.g. binders) then emissions arising from those materials should be accounted for when the processes biomass residues are combusted. For that purpose those materials should be deemed as fossil fuels. If net calorific values, carbon content and/or emission factors of those material are available they could be used, otherwise the net calorific values, carbon content and/or emission factors of the most carbon intensive fossil fuel available in the county should be used.

The latest approved version of the "Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" version 02 (versions which may be updated, as necessary) will be used to calculate $PE_{FF,y}$. All combustion processes *j* as described in the two bullets above will be included.

Determination of $PE_{EL,y}$

Emission should be included that result from the generation of electric power required or the operation of equipment related to the off-site preparation processing, storage and transportation of biomass residues (e.g. for mechanical treatment of the biomass, conveyor belts, driers, pelletization, shredding, briquetting processes, etc.). The latest approved version of the "Tool to calculate baseline, project and/or leakage emissions from electricity consumption" version 01 (versions which may be updated, as necessary) shall

be used to calculate the $PE_{EL,y}$. Note that the electric power used on-site for the purposes described above area already accounted as part of $EG_{PJ,aux,y}$. $PE_{EL,y}$ should account thus only for the off-site use of electricity.

Determination of $PE_{TR,y}$

In cases where the biomass residues are not generated directly at the project site, project participant shall determined CO_2 emissions resulting from transportation of the biomass residues to the project plant using the latest version of the tool "Project and leakage emissions from transportation of freight". $PE_{TR,m}$ in the tool corresponds to the parameter $PE_{TR,y}$ in this methodology and the monitoring period *m* is one year.

Determination of $PE_{BR,y}$

If project proponents chose to include emissions due to uncontrolled burning or decay of biomass residues ($BE_{BR,y}$) in the calculation of baseline emission, then emissions from the combustion of biomass residues have also to be included in the project scenario. Otherwise, this emission source need not be included. Corresponding emissions are calculated as follows:

$$PE_{BR,y} = GWP_{CH4} \cdot EF_{CH4,BR} \cdot \sum_{n} BR_{PJ,n,y} \cdot NCV_{n,y} \quad \textbf{(28)}$$

Where:

PE_{BRy}

GWP_{CH4} global warming potential for methane valid for the relevant commitment period (tCO_2/ tCH_4)

$EF_{CH4,BR}$ CH_4 emission factor for the combustion of biomass residues in the project plant (tCH_4/GJ)

$BR_{PJ,n,y}$ Quantity of biomass residues of category *n* used in power plants which are located at the project site and included in the project boundary in year *y* (tonnes on dry-basis/yr)

$NCV_{n,y}$ net calorific value of the biomass residues category *n* in year *y* (GJ/ tonnes on dry-basis)

To determine the CH_4 emission factor, project participant may conduct measurements at the plant site or use IPCC default values, as provided in Table 3 below. The uncertainty of the CH_4 emission factor is in many cases relatively high. In order to reflect this and for the purpose of providing conservative estimates of emission reductions, a conservativeness factor must be applied to the CH_4 emission factor. The level of the conservativeness factor depends on the uncertainty range of the estimate for the CH_4 emission factor. Project participant will select the appropriate conservativeness factor from Table 4 below and will multiply the estimate for the CH4 emission factor with the conservativeness factor.

Default CH4 emission factors for combustion of biomass residues[6], as per Table 4 of ACM0018 ver. 02.0.0

	Default emission factor (kg CH_4/TJ)	**Assumed uncertainty**
Wood waste	30	300%
Sulphite lyes (Black Liquor)	3	300%
Other solid biomass residues	30	300%
Liquid biomass residues	3	300%

Conservativeness factors, as per Table 5 of ACM0018 ver. 02.0.0

Estimated uncertainty range (%)	**Assigned**	**Conservativeness factor**

[6] Values are based on the 2006 IPCC Guidelines, Volume 2, Chapter 2, Tables 2.2 to 2.6

	uncertainty band (%)	where higher values are more conservative
Less than or equal to 10	7	1.02
Greater than 10 and less than or equal to 30	20	1.06
Greater than 30 and less than or equal to 50	40	1.12
Greater than 50 and less than or equal to 100	75	1.21
Greater than 100	150	1.37

Determination of $PE_{WW,CH4,y}$

This emission source is estimated in cases where wastewater originating from the treatment of the biomass is (partly) treated under anaerobic conditions and methane from the wastewater is not captured and flared or combusted. Project emissions from wastewater are estimated as follows:

$$PE_{WW,CH4,y} = GWP_{CH4} \cdot V_{WW,y} \cdot COD_{WW,y} \cdot B_{o,WW} \cdot MCF_{WW} \quad \textbf{(29)}$$

Where:

$PE_{ww,CH4,y}$	CH_4 emission from wastewater generated from the treatment of biomass residues in year *y* (tCO_2)
GWP_{CH4}	global warming potential for methane valid for the relevant commitment period (tCO_2/ tCH_4)
$V_{ww,y}$	quantity of waste water generated in year *y* (m^3)
$COD_{ww,y}$	average chemical oxygen demand of the wastewater in year *y* (tCOD/ m^3)
$B_{o,ww}$	methane generation potential of the wastewater (tCH_4/ tCOD)[7]
MCF_{ww}	methane correction factor of the wastewater (ratio)[8]

Leakage Emission

The main potential source of leakage for this project activity is an increase in emissions from fossil fuels combustion or other sources due to diversion of biomass residues from other uses to the project plant as a result of the project activity. Changes in carbon stocks in the LULUCF sector are expected to be insignificant since this methodology is limited to biomass residues, as defined in the applicability conditions above. The baseline scenarios for biomass residues for which this potential leakage is relevant are B5, B6, B7 and B8.

The actual leakage emissions in each of these cases may differ significantly and depend on the specific situation of each project activity. For that reason, a simplified approach is use in this methodology: it is assumed that an equivalent amount of fossil fuels, on energy basis, would be used if biomass residues are diverted from other uses, no matter what the use of biomass residues would be in the baseline scenario.

Therefore, for the categories of biomass residues whose baseline scenario has been identified as B5, B6, B7 or B8, project participants shall calculate leakage emission as follows:

$$LE_y = EF_{CO2,LE} \cdot \sum_n BR_{PJ,n,y} \cdot NCV_{n,y} \quad \textbf{(30)}$$

[7] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 6 Page 6.12Table 6.2

[8] 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5 Chapter 6 Page 6.13Table 6.3

Where:

LE_y	leakage emissions in year *y* (tCO_2/yr)
$EF_{CO2,LE}$	CO_2 emission factor of the most carbon intensive fossil fuel used in the country (tCO_2/GJ)
$BR_{PJ,n,y}$	quantity of biomass residues of category *n* used in power plants which are located at the project site and included in the project boundary in year *y* (tonnes on dry-basis/yr)
$NCV_{n,y}$	net calorific value of the biomass residues category *n* in year *y* (GJ/ton of dry matter)
n	categories of biomass residues for which B5, B6, B7 or B8 has been identified as the baseline scenario

The determination of $BR_{PJ,n,y}$ shall be based on the monitored amounts of biomass residues used in power plants included in the project boundary.

In the case that negative overall emission reductions arise in a year through application of the leakage emission, CERS are not issue to project participants for the year concerned and in subsequent years, until emission reductions from subsequent years have compensated the quantity of negative emission reductions from the year concerned. For example, if negative emission reductions of 30 tCO_2e occur in the year t and positive emission reductions of 100 tCO_2e occur in the year t+1, only 70 CERs are issued for the year t+1.

Changes required for methodology implementation in 2nd and 3rd crediting periods

At the start of the second and third crediting period for a project activity, the continued validity of the baseline shall be assessed by applying the latest version of the tool "Assessment of the validity of the original/ current baseline and update of the baseline at the renewal of the crediting period".

B.5.3. Summary of the ex-ante estimation of emission reductions:

Year	Estimation of project activity emissions (tonnes of CO_2 e)	Estimation of baseline emissions (tonnes of CO_2 e)	Estimation of leakage (tonnes of CO_2 e)	Estimation of overall emission reductions (tonnes of CO_2 e)
Year 1	[XXX]	[XXX]	[XXX]	[XXX]
Year 2	[XXX]	[XXX]	[XXX]	[XXX]
Year 3	[XXX]	[XXX]	[XXX]	[XXX]
Year ….	[XXX]	[XXX]	[XXX]	[XXX]
Total (tonnes of CO_2 e)	[XXX]	[XXX]	[XXX]	[XXX]

B.6. Application of the monitoring methodology and description of the monitoring plan:

B.6.1. Description of the monitoring plan:

Data and parameters to be monitored by the CPA:

Data / Parameter:	**[XXX]**
Data unit:	[XXX]
Description:	[XXX]
Source of data:	[XXX]

Measurement procedures (if any):	[XXX]
Monitoring frequency:	[XXX]
QA/QC procedures:	[XXX]
Any comment:	[XXX]

Monitoring Plan:
[XXX]

[OPERATIONAL AND MANAGEMENT STRUCTURE FOR PROJECT ACTIVITY]

[MONITORING DIAGRAM]

ECTION C. Environmental analysis

C.1. Please indicate the level at which environmental analysis as per requirements of the CDM modalities and procedures is undertaken. Justify the choice of level at which the environmental analysis is undertaken:

☐ Please tick if this information is provided at the PoA level. In this case sections C.2. and C.3. need not be completed in this form.

[XXX]

C.2. Documentation on the analysis of the environmental impacts, including transboundary impacts:

[DISCUSSION ON ENVIRONMENTAL IMPACTS, INCLUDING TRANSBOUNDARY IMPACTS]

C.3. Please state whether in accordance with the host Party laws/regulations, an environmental impact assessment is required for a typical CPA, included in the programme of activities (PoA),:

In accordance with the host county's environmental regulations, the "Environmental Quality (Prescribed Activities) (Environmental Impact Assessment) order 1987", an environmental impact assessment (EIA) is not required for a typical project activity generating power from utilization of biomass residues.

SECTION D. Stakeholders' comments

D.1. Please indicate the level at which local stakeholder comments are invited. Justify the choice:

☐ Please tick if this information is provided at the PoA level. In this case sections D.2. to D.4. need not be completed in this form.

[XXX]

D.2. Brief description how comments by local stakeholders have been invited and compiled:

[DISCUSSION ON LOCAL STAKEHOLDER MEETING]

D.3. Summary of the comments received:

Q1: [XXX]

Q2: [XXX]

Q3: [XXX]

Q4: …

D.4. Report on how due account was taken of any comments received:

A1: [XXX]

A2: [XXX]

A3: [XXX]

A4: …

Annex 1

CONTACT INFORMATION ON ENTITY/INDIVIDUAL RESPONSIBLE FOR THE CPA

Organization:	[MALAYSIA PROJECT PARTICIPANT DETAILS]
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	
Direct FAX:	
Direct tel:	
Personal E-Mail:	

Organization:	[ANNEX 1 COUNTY PROJECT PARTICIPANT DETAILS]
Street/P.O.Box:	
Building:	
City:	
State/Region:	
Postfix/ZIP:	
Country:	
Telephone:	
FAX:	
E-Mail:	
URL:	
Represented by:	
Title:	
Salutation:	
Last Name:	
Middle Name:	
First Name:	
Department:	
Mobile:	

Direct FAX:	
Direct tel:	
Personal E-Mail:	

Annex 2

INFORMATION REGARDING PUBLIC FUNDING

The project [has/has not] obtained and [is/ is not] seeking any public funding.

Annex 3

BASELINE INFORMATION

[ADDITIONAL BASELINE INFORMATION]

Annex 4

MONITORING INFORMATION

- - - - -